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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of	) Group Art Unit: 1632
Raymond H. Boutin	) Examiner: D. Crouch
Appln. No.	)
Filed: Herewith	)
For: MULTIFUNCTIONAL MOLECULAR COMPLEXES FOR GENE TRANSFER TO CELLS	) November 13, 2001

Assistant Commissioner for Patents
Box Sequence
Washington, DC 20231

PRELIMINARY AMENDMENT A

Sir:

Please amend the above-identified patent application as follows.

In the Specification

Page 1, line 3, before "Background of the Invention", insert the following new paragraph:

-- CROSS-REFERENCE TO RELATED APPLICATIONS

This is a divisional of U. S. Patent Application No. 09/425,597, filed October 22, 1999, which is a divisional of U. S. Patent Application No. 08/809,397, filed March 21, 1997, now U. S. Patent No. 6,127,170, issued October 3, 2000, which is a 35 USC §371 of PCT/US95/12502, filed September 28, 1995, which claims the benefit of the priority of U. S. Patent Application No. 08/314,060, filed September 28, 1994, now U. S. Patent No. 5,837,533, issued November 17, 1998. --

Express Mail No. ET033435671US

Page 11, delete the paragraph spanning lines 1-9 and replace it with the following paragraph:

-- Combinations of lipids have been used to facilitate the transfer of nucleic acids into cells. For example, in US Patent 5,283,185 there is disclosed such a method which utilizes a mixed lipid dispersion of a cationic lipid with a co-lipid in a suitable solvent. The lipid has a structure which includes a lipophilic group derived from cholesterol, a linker bond, a linear alkyl spacer arm, and a cationic amino group; and the co-lipid is phosphatidylcholine or phosphatidylethanolamine. --

Page 20, delete the paragraph spanning lines 20-22 and replace it with the following paragraph:

-- iv) N^2,N^6-bis(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysyl-N^6-(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysine; --

Page 20, delete the paragraph spanning line 23 and replace it with the following paragraph.

-- v) 5-methyltetrahydrofolate; --

Pages 21-22, delete the paragraph spanning page 21, line 30 to page 22, line 19 and replace it with the following paragraph:

-- The size, nature and specific sequence of the nucleic acid composition to be transferred to the target cell can be optimized for the particular application for which it is intended, and such optimization is well within the skill of the artisan in this field. However, the nature of the target cells within the individual into which it is desired to transfer a nucleic acid composition, may have a significant bearing on the choice of the particular multifunctional molecular complex of the present invention. For example, where it is desired to transfer nucleic acid molecules to target cells by injecting them intramuscularly to evoke an

immune response, it will be found that this transfer can be effected by use of a multifunctional molecular complex of the present invention, as defined above, comprising a cationic polyamine to which is attached, as the endosome membrane disruption promoting component, a lipophilic long chain alkyl group as defined above. Where the target cells are hepatocytes, for example, transfer of the desired nucleic acid composition is readily effected by use of the multifunctional molecular complex of the present invention wherein there is attached to the cationic polyamine a receptor specific binding component which will permit discrimination among body cells, comprising, e.g., N^2,N^6-bis(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysine, or N^2,N^6-bis(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysyl-N^6-(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysine. --

Page 24, delete the paragraph spanning lines 1-35 and replace it with the following paragraph:

-- It will be appreciated that in one embodiment of the present invention, a single cationic polyamine can be employed which, conceptually, balances the anionic charges of the nucleic acid in a more or less stoichiometric fashion, although it will be understood that, as a practical matter, it will be necessary to employ amounts of cationic polyamine which are significantly in excess of the stoichiometric amount, because of the presence of competing binding sites in target and other cells, whose existence is well known to the artisan and which competitively prevent or otherwise interfere with the binding of the polyamine to the nucleic acid as desired. It is also contemplated that more than one such cationic polyamine can be employed, in which case each polyamine chain or piece is smaller than the corresponding nucleic acid to which it will become bound. It will be understood, however, that the total size or length of these individual cationic polyamine

components should together be substantially the same size or length as the nucleic acid component, in order for neutralization of the anionic charges of the nucleic acid to take place. Again, it will be understood that for practical reasons, a significant excess of cationic polyamine components, over the amount of nucleic acid component present, will be necessary. Using more than one cationic polyamine component permits flexibility with respect to the types of groups that are attached thereto. For example, one cationic polyamine component may carry a particular endosome membrane disruption promoting component, while another cationic polyamine component carries a receptor specific binding component, or perhaps a different endosome membrane disruption promoting component. The total number of such cationic polyamine components is variable, and will depend not only on the size or length of the nucleic acid component, but on the number and type of groups attached thereto as well. --

Page 34, delete the paragraph spanning lines 24-26 and replace it with the following paragraph:

-- iv) N^2,N^6-bis(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysyl-N^6-(β-3'-propionyl galactosyl-β1-4-thioglucoside)lysine; --

Page 78, delete the paragraph spanning lines 20-27 and replace it with the following paragraph:

-- Similar results can also be obtained with N^4-octylspermidine; N^4-dodecylspermidine, fusogenic peptides acylated on the N-terminus by N^4-(5-carboxypentyl)spermidine; N^4-(5-(cholest-5-en-3'-β-carbamoyl)-aminopentyl)spermidine; and N^4-(5-(3α,7α,12α-trihydroxy-5β-cholan-24-oic)aminopentyl)-spermidine amide, with the endosome membrane disruption promoting component included therein. --

REMARKS

Upon entry of this preliminary amendment, claims 1-48 are in this application.

Applicants and the undersigned attorney herewith submit a "Clean Copy" of the specification which is provided for publication purposes of the above-identified divisional patent application as required under 37 CFR 1.215(a).

The amendments to the specification were made to update the cross-reference to related applications and to correct clear typographical errors. Subject matter being added to the specified sections of the specification is represented by highlighting, while material being deleted is represented by strikeout. No new matter is added by these amendments.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached Appendix A is captioned "**Version With Markings to Show Changes Made**".

The Director of the U. S. Patent and Trademark Office is hereby authorized to charge any deficiency in any fees due with the filing of this paper or credit any overpayment in any fees to Deposit Account No. 08-3040.

Respectfully submitted,

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Appendix A

Version with Markings to Show Changes Made

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